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CENTRAL INTELLIGENCE AGENCY

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SECURITY INFORMATION

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1. Aside from sporadic and occasional press reports with only relative figures of little value for comparative estimate there are no indications on the light metal requirements of the Soviet Union. The following requirement calculations which are meant to provide a general picture on the Soviet light metal supply are based on the total light metal consumption. The aluminum shares are computed at the end.

The key figures of the amounts needed for industrial production (needed raw material amounts for one ton of finished product) and the proportionate figures of various semifinished products (rolled materials, shaped pieces, forgings in relation to castings and pressings) correspond to German industrial experiences.

2. Two thirds of the light metal requirements are used by the aircraft industry. The structural weight of the different aircraft models designed as all-metal constructions is used as a basic figure. The steel share is subtracted and the number obtained multiplied by the key figure.

(1) According to German experiences 20 percent has to be added for stockpiling, development, accessories and spare parts. This gives the following estimated overall average of the different models:

	Total structural weight	Steel share	Light metal share	Light metal share in percentage figures	Needed amount of light metal
Four-engine combat planes	25.0t	5.5t	19.5t	78	39.0t
Twin-engine combat and transport planes	9.0t	3.3t	5.7t	63	11.0t
Ground-attack planes	4.0t	1.6t	2.4t	60	5.0t
Jet planes	4.0t	2.0t	2.0t	50	4.0t
Fighter planes	3.0t	1.2t	1.8t	60	3.5t
School and training planes (except elementary school planes)	1.6t	0.5t	1.1t	69	2.0t

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On the basis of former information, the production figures of the aircraft industry for 1948 and 1950 can be estimated as follows:

	1948	1950
Four-engine combat planes	480	540
Twin-engine combat, reconnaissance and transport planes	4,800	6,500
Single-engine ground-attack planes	3,600	5,400
Turbine and jet planes	4,800	8,400
Other fighter planes	9,600	12,000
Training planes	4,800	6,600
	28,080	39,440

(2) According to these figures the 1948 production of the aircraft industry demanded 150,000 tons (151,900) of light metal supplies and the 1950 production will approximate 200,000 tons (198,400). Including additional amounts for stockpiling, etc., totaling 37,900 and 49,600 tons respectively, the total light metal requirements for the aircraft industry approximate:

190,000 tons (189,800) for 1948
and
250,000 tons (248,000) for 1950.

b. Estimates on the remaining armament industry:

(1) Tank construction:

The light metal share of the weight of the finished product is two tons per 100 tanks. (Multiplied by two - key figure of needed amounts) Sixty percent added for accessories, spare parts, development and stockpiling. Assuming a total production figure of 31,000 tanks (including armored reconnaissance cars and armored vehicles) for 1948 and of 49,800 tanks for 1950 (high utilization of capacity), the light metal requirements would be 2,000 tons for 1948 and 3,200 tons for 1950.

(2) Weapon production:

The light metal requirements approximate 1.4 percent of the iron and steel needs which were 233,000 tons in 1948 and will be 263,000 tons in 1950. The corresponding light metal consumption for weapon production approximated 3,300 tons in 1948 and 3,700 tons in 1950.

(3) Warship building (especially engine casings, cylinders, piston rods, bumpers, gear boxes, jackets):

The light metal share is estimated at 7 kg per gross registered ton (to be multiplied by the key figure 1.9). Assuming a building output of 150,000 gross registered tons for 1948 and 180,000 gross registered tons for 1950 the estimated light metal requirements of the naval shipyards are 6,200 tons for 1948 and 6,900 tons for 1950.*

c. Ship, steel and vehicle construction (engine and machine casings, gear rims, bearings, pistons, bushings, jackets, fittings, etc.)

(1) In mercantile shipbuilding about 5 kg of finished products per gross registered ton correspond to 9.5 kg of required light metal amount. Assuming a building output of 300,000 gross registered tons for 1948 and 400,000 gross registered tons for 1950 the light metal requirements can be estimated at 2,900 tons for 1948 and 3,800 tons for 1950.

(2) In the steel industry the locomotive construction is the main consumer of light metals, averaging a 100 kg share of the weight of a finished locomotive. The key figure for needed amounts is 1.8, a 35 percent increase to be added for spare parts and accessories, reserve containers etc. An estimated 1948 output of 1,800 locomotives and an estimated 1950 output of 2,720 locomotives would require 500 and 700 tons of light metal supplies respectively.

(3) In the motor vehicle industry the average light metal share for 100 vehicles is 0.8 tons. The consumer amount is about twice as much. The total output of the motor vehicle industry, including tractors, trailers and motorcycles, is estimated at 533,000 and 781,000 for 1948 and 1950 respectively. The corresponding light metal requirements are 8,500 tons for 1948 and 12,500 tons for 1950.

d. Construction of machines, apparatus and boilers (light metal needed for fittings, slide bearing, coupling and driving gear elements, apparatus, containers, single parts for installations of the chemical and food-producing industries as well as for internal combustion engines). According to German experience, 2 to 2.5 kg of light metal supplies are required per one ton of steel. Assuming the 1948 and 1950 iron and steel requirements at 3.35 and 4.32 million tons respectively it would amount to a light metal consumption of 8,400 tons for 1948 and 10,800 tons for 1950.

e. It is difficult to estimate the requirements of the electric industry and the fine mechanical and optical industries. Light metal supplies are required especially for electric measuring and testing instruments; winding wires for condensers, transformers, and converters; casings and jackets for electromotors and electric machines, regulating instruments; navigational, hydrological, and meteorological instruments; as well as medical-mechanical instruments.

(1) In the following estimates it is not considered that light metal may be extensively used as a substitute for copper and brass especially in the production of electric wiring materials, cables, and armatures, as has been done in prewar and postwar Germany.

(2) For the purpose of this study the light metal requirements would be, according to German experiences, 30 kg per ton of finished product (to be multiplied with the key figure 2.2). As only very rough estimates can be made on the total weight of the electrotechnical, fine mechanical, and optical production, 115 kg per ton of iron and steel needs are assumed, based on comparative German figures. Thus, the light metal requirements for electro-technical, fine mechanical, and optical products would be 18,500 tons for 1948 and 20,800 tons for 1950.*

f. Light metals are also used in the iron-plate and metal-ware industries, especially for light sheet packings, transportation containers, sheet metal constructions, and particularly for household and kitchen utensils.

(1) The light metal consumption per person of the population is probably far below the German standard (just as in steel consumption for sheet metal wares and household items), which was 0.55 kg. In the Soviet Union it may be at best 0.1 kg. Thus the light metal requirements for iron-plate and metal-wares would be 19,000 tons for 1948 and 19,300 tons for 1950. *

(2) Light metals are of considerable importance for the construction of fittings and locks. At least the same amounts can be assumed as for the German production. This would mean 10,000 tons for 1948 and 12,000 tons for 1950.

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g. A conservative estimate of the light metal requirements for the building industry (pressed, drawn, and punched parts; standard parts, screws, rivets, metal-construction parts, etc.) would be half of the German quota, or about 5.5 kg of light metal per ton of steel. Thus, these requirements would be 11,000 tons for 1948 and 13,200 tons for 1950. *

3. The total needs of light metal semi-finished materials can be estimated at about 280,000 tons (282,000) for 1948 and about 355,000 tons (354,000) for 1950.

a. Experience has proved that this total amount is divided into 24 to 25 percent pure aluminum semi-finished materials, 60 to 62 percent aluminum alloys, and 14 to 15 percent aluminum-bronze, aluminum steels, and magnesium alloys.

(1) The specified aluminum consumption would be as follows (in 1,000 tons):

	1948	1950
Pure aluminum semi-finished materials	66	85
Aluminum alloys	174	220
Aluminum bronze and aluminum steels, magnesium alloys	40	50

b. Pure aluminum semi-finished materials can be produced only from primary metals and the same applies to those aluminum and magnesium alloys as well as aluminum steels used by the armament industry, particularly by the aircraft industry. The remaining alloys--especially castings--can be produced from resmelted metals.

(1) The aluminum content in pure aluminum semi-finished materials is at least 98 percent, in aluminum alloys at least 87 to 88 percent, in aluminum-bronze, aluminum steels, and magnesium-alloys on the average 4 to 5 percent.

(2) The consumption figures based on aluminum content would be as follows (in 1,000 tons):

	1948	1950
Al in pure aluminum semi-finished materials	65	83.5
Al in aluminum alloys	153	194
Al in aluminum-bronze and aluminum steels as well as magnesium alloys	2	2.5
	220	280.0

According to experience, about half of the semi-finished materials are rolled materials, shaped pieces, and forgings and the other half castings and pressings.

4. The preliminary rough estimate of the Soviet aluminum production is therefor

134,000 tons of primary aluminum and
66,000 tons of secondary aluminum for 1948,
and
200,000 tons of primary aluminum and
70,000 tons of secondary aluminum for 1950.

5. The Soviet requirements can hardly be met or could barely be covered under certain restrictions. The available amount of primary aluminum will presumably be sufficient.

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[redacted] Comment: Inadequate explanations have been given for conclusions drawn. Figures are as received.